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Social Science Research and the Bitterroot National Forest: An Assessment and Synthesis

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Social Science Research and the Bitterroot National Forest: An Assessment and Synthesis

Prepared for

Bitterroot Ecosystem Management-Research Project

Technical Completion Report

Research Joint Venture Agreement
RMRS-98504-RJVA

By

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Preface

This report was undertaken as part of the Bitterroot Ecosystem Management-Research Project, a joint research and management demonstration project involving managers from the Bitterroot National Forest, the Rocky Mountain Research Station and the School of Forestry at The University of Montana. Our objective was to synthesize the social science research conducted in the region that has applicability to management of the Forest. In our original proposal, we had suggested that the Forest identify the significant issues and questions confronting it as it moves into a new era of management in an upcoming millenium. The Forest, however, asked us to only identify the themes of research previously conducted. We have attempted to do so, but are certain our efforts may not be relevant to the information needs of the Forest.

The synthesis was conducted by collecting all relevant research and planning documents, developing an annotated bibliography, shown in the Appendix, reading the research, and through an iterative process of developing and discussing major conclusions and findings, writing this paper. The findings reported herein, as discussed in the text, are necessarily interpretive. We have attempted to be concise and conservative in our conclusions. However, we have also applied extensive experience with agency planning processes, research methodology, natural resource planning and environmental assessments in developing this report. The contents of the report remain solely the responsibility of the three authors.

The paper was supported in part by Research Joint Venture Agreement RMRS-98504-RJVA between the USDA Forest Service and The University of Montana.

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Executive Summary

The research review provided herein recognized several major contextualizing factors that influence how the research was conducted and its meaning within the context of ecosystem-based management processes on the Bitterroot National Forest. These factors include:

- *The geographic context for the BNF places it within a region of concentrated amenities juxtaposed to significant commodity resources*

- *The mountains surrounding the valley serve as an attractant to new residents because of their scenic beauty and proximity for outdoor recreational experiences*

- *Dramatic increases in human population place strains on the urban--wildland interface*

- *The natural resources management policy environment is characterized by lack of agreement over goals and methods*

- *Federal funding for management of the BNF has declined significantly in the last decade, forcing administrative reorganization, reduction in personnel, and shifting priorities*

- *Accompanying reductions in funding for management have been changes in the mix of goods and services the public demands from the Forest*

- *Changes in federal land management policies over the years have created uncertainty about the direction that agency leaders may take.*

The above seven contextualizing factors serve to make the environment for research and management complex, (messy as we argue in the main body of the report), pointing out deep deficiencies in social science research and its relevancy to management.

We note that social science research concerning the BNF is not extensive, and many of the findings are several years old. This conclusion is not to fault any one; given the extremely limited funding for this type of research and the general low priority that it is given in most management situations, we were not surprised. Our review of research identified four major themes, each with its own set of findings.

First, one primary area of research has dealt with public attitudes toward the BNF and its management of the landscape. In general, attitudes tend to be bi-modal, with the majority of the public satisfied, but a substantial minority dissatisfied. Yet, this research demonstrates that the dissatisfaction with management that has typified the agency over the last three decades continues to this day.

A second primary area concerns the relationships the BNF has with its publics. This research has focused on measures of successful public participation, views of consensus processes, evaluations of the use of sophisticated technology and computer models in public meetings, and suggestions for new methods of public participation. This research generally acknowledges the good faith attempts of the BNF to improve its relationships, but also suggests, not surprisingly given the history of the Forest, that there is a ways to go.

A third area deals with investigations of recreation and wilderness users. This area of research points to two major findings: (1) the Selway-Bitterroot Wilderness has been used in several studies, but more because of its convenience to conduct research on specific wilderness user issues than to create understanding for management; and (2) that visitors are generally satisfied with the level of facility development and recreation services available in recreation settings outside the wilderness.

The final area of research deals with the role of the BNF in local economic development, particularly tourism. This area has not been well developed, but shows some disagreement about the acceptability of tourism development with valley residents.

Given the paucity of research, a more comprehensive and systematic social science research program oriented around the following themes would be useful in developing a better understanding of the interactions people have with natural resources in the Bitterroot National Forest:

First, the high rates of migration into the valley and the pace of social change suggest continuing conflict and controversy. Better understanding of the role of aesthetics and other amenities would help identify differences in attitudes toward the environment between newcomers and oldtimers and suggest possible ethical bases for conflict.

Second, in a county that is growing rapidly that has had difficulty developing a vision of its future where the Forest Service manages nearly three-quarters of the land, transboundary questions are important. Such issues include collaborative relationships,

intergovernmental agreements, the significance of the three wildernesses to the public, and how boundaries are perceived.

Third, much of the population growth is occurring near the national forest boundary, in the urban-wildland interface. Such population growth raises a number of significant questions with respect to fire suppression, use of fire as a management tool, habitat fragmentation and access to the forest.

A fourth area concerns the planning and policy mechanisms to deal with contentious issues. How do people cope with policy change? What institutional arrangements are available to enhance learning and establish venues for safe and secure discussion of land management? Is the forest planning process appropriate to the type of messy situation the BNF finds itself enmeshed in?

Finally, the recreational and wilderness resources on the forest are substantial, yet the knowledge base with respect to management of visitors is minimal. Research on visitors would help identify acceptability of management actions, motives and benefits from participation, and perceptions of popular use limit techniques.

Introduction and Overview

The Bitterroot National Forest (BNF) manages natural resources under its jurisdiction within a context of change and significant political scrutiny. Such a context suggests a need for an active, relevant social science research program to better understand linkages between people and natural resources. Both change and increased scrutiny have led to the need for increased understanding of not only how ecological systems function but also how human communities are linked to those systems, respond to them and react to administrative proposals for their management. This knowledge is increasingly critical as national forest management moves into an era of ecosystem-based management. With the evolution of decision-making to the landscape level management (over stand level), there is both increased awareness that large scale ecological processes must be accounted for, increased sensitivity to the lack of science-based knowledge in predicting consequences of actions at that scale, and how those consequences may affect people at different scales.

The Bitterroot Ecosystem Management-Research Project (BEMRP) was developed in response to these needs. The project, a three way cooperative among the Bitterroot National Forest, Rocky Mountain Research Station, and The University of Montana, is designed to provide scientific information on ecosystem structure and function such that more informed decisions can be made. Research performed under the auspices of BEMRP has in the past focused on national forest lands located within the Stevensville Ranger District, although this is changing. The project involves four teams of scientist-manager partners dealing with social aspects of ecosystems, landscape analysis, vegetation, and fauna.

BEMRP is an attempt to conduct cross-disciplinary research on a variety of natural resource management questions. A portion of the research has examined certain questions and issues from a social science perspective. While several of these studies have emphasized resources and relationships on the Stevensville District, results may have implications for the BNF as a whole. While the amount of research conducted by BEMRP could not be described as voluminous, social science research on other parts of the Forest that have a bearing on issue identification, acceptability of management practices, and the role of the Forest in providing resources for recreation and community economic development has been conducted. These studies have been conducted independently with frequently differing, and sometimes conflicting, methodologies. Never-the-less, we have included them in this review in an attempt to be more comprehensive.

The result is an array of social science research, not large in quantity, whose conclusions and implications may be difficult to sort out even though it may relate to specific national forest management issues. The goal of this report is to provide decision-makers with a readable, succinct synthesis of this research, primarily that conducted within the last 15 years. More specifically, the objectives of this report are to:

A. Inventory all relevant social science research through an annotated bibliography
B. Identify primary themes of this research
C. Describe significant conclusions of this research as they apply to management of the BNF
D. Identify gaps in knowledge and questions that social science research could address.

But, because this is an *integrative* synthesis of research, our discussion does not focus on a restatement of the factual content of the social science research inventoried[1]. The focus of this synthesis report is necessarily interpretive, based on our assessment of the important trends and broader policy and social changes within which the research was conducted. This report attempts to find *meaning* of past research within the context of national forest management, based on *our* reading of the research, *our* experience with social sciences and natural resources, and *our* understanding of current issues and questions about natural resources facing society. Thus, our coverage of research will extend at times beyond what was specifically conducted on the BNF. We note that the social science research reviewed here has neither been replicated, an important scientific protocol, nor has it been organized by an overall vision with an agreed set of questions. This condition severely limits our ability to synthesize research efforts with confidence and it has led to socially important issues being ignored.

This report is organized around six major sections. First, we examine the social and policy context for the BNF. In this section, we briefly outline the larger scale processes and conditions within which the BNF operates. Research conclusions, implications and applications are not a-contextual; therefore understanding how social science research can be used must involve a presentation, if brief, of the important social and policy trends affecting the Forest. While we don't want to emphasize the negative, a significant point in this discussion is the long-standing contentious nature of management of the BNF.

The next four sections of the report deal each with the primary themes of research uncovered in our review. The first theme concerns perceptions of the Forest Service, the BNF, and its natural resource management policies. How people perceive the agency is an important

[1] For factual summaries of relevant research, please see the annotated bibliography.

component of planning processes and affects how people respond to management proposals. We note that this section focuses on the agency, not the landscape. How people relate to and define the landscape is an important, but neglected area of research in this setting. Elements such as the credibility of the agency, its track record in carrying out approved actions, and the divisiveness among its publics over goals are significant influences on the administration's ability to act and to serve socially important functions.

The second theme concerns relationships between the public and the BNF. The BNF has been at the forefront of national-level policy development regarding the roles of local and national interests on federally administrated lands. Relationships with the public over the last three decades have been tumultuous, beginning with the clearcutting and terracing controversies of the 1960's. Current debates over restoration of endangered species such as grizzly bears and wolves, while not directly a Forest Service issue, continue to attract regional and national attention. Relationships with the public are important considerations because without good relationships, the public can effectively hold veto power over implementation proposed management actions. In a long ago speech, then Forest Supervisor Orville Daniels (1971) suggested that the contentiousness over BNF policy was not due so much to management practices as the agency's relationship with its publics. While this conclusion may overstate the social acceptability of clearcutting, terracing and roadbuilding practices, it does underscore the attention that need be placed on public participation. The public cannot be expected to understand and support resource management activities for which they have had no involvement in development.

A third theme deals with the role of the forest in meeting recreational and quality of life needs of the public. The BNF serves important functions in providing wildland recreational opportunities--and wilderness opportunities--for both the people of the region and the nation as well. Understanding the needs, preferences and knowledge levels of visitors underlies development of effective management that not only protects the resource base upon such recreation depends, but also in leading to satisfactory recreational experiences. Too, the BNF provides a scenic backdrop to residential and commercial development in the Valley, enhancing the quality of life of those living there.

The final primary theme concerns the role of the BNF in local economic development. The BNF supplies not only the commodity and recreational resources needed for economic development but also serves as a scenic backdrop that is increasingly important to footloose business development and relocation decisions. The Bitterroot Valley

serves as the operational base for a number of log home manufacturers, originally located there because of the supply of logs. While the supply situation has changed, it remains an important center for this type of manufacturing. The role and the responsibility of the BNF for economic development are influenced by both national legislation (such as the Farm Bill of 1991) and community level demands for both commodities and attention to aesthetics. For example, there have been recent initiatives to examine the potential of tourism related to the forest's significant recreational resources, including the wilderness administered by it.

We close our report by first identifying major conclusions of this review, which serve as a segue to a discussion of the gaps in our understanding of the interactions between people and natural resources on the BNF as a suggestion for a research agenda in the future. We believe such suggestions are an important component of this report, given not only the limited quantity of social science research available for review, but also because the administrative renewal of the BEMRP program provides an opportunity to address these gaps.

The administrative, social and policy context for research and management

Social science research cannot be interpreted outside the context of its administrative, political and social environment. The forest administration is buffeted by a large array of economic, social and policy initiatives and changes that can neither be predicted, nor necessarily completely understood. The pace of change has quickened, and the scale and increasing contextual complexity also influence what happens on the BNF. Residents of the Bitterroot Valley have experienced the same profound changes that have affected rural areas nationwide – a delinking of production and consumption (Drucker 1986), increased population growth due to net inmigration (Johnson and Beale 1994), shifts in values and expectations of what forest lands should produce (Krannich et al. 1994) and increased conflict over both management goals and actions.

The geographic context for the BNF places it within a region of concentrated amenities juxtaposed to significant commodity resources

The BNF is located in Western Montana and contained primarily, but not totally, within the Bitterroot River watershed and Ravalli County[2]. The Forest Service administers 1.6 million acres, 47% of which is located within three federally designated wildernesses: Selway-

[2] Portions of the BNF are located in Idaho within the Selway River watershed.

Bitterroot, Anaconda-Pintler and Frank Church-River of No Return. The upper Selway River is designated as a Wild River under the Wild and Scenic Rivers Act of 1968. The low elevation portions of the Bitterroot Valley are largely owned privately, with the forest surrounding it in a horseshoe shape. The mountains themselves (the Bitterroot and Sapphire Ranges) provide a scenically superlative backdrop to both commercial and residential development.

The economic dependence on wood production developed in the late 1960's has shifted from primary wood milling with supply from local sources, to more specialized industries like log home construction that obtain its raw materials from outside the valley. Other industries, particularly the service sector, have emerged as having much greater economic significance than traditional industries such as agriculture, grazing, and logging. And, much of the personal income in the valley derives from transfer payments such as Social Security and pensions (Figure 1).

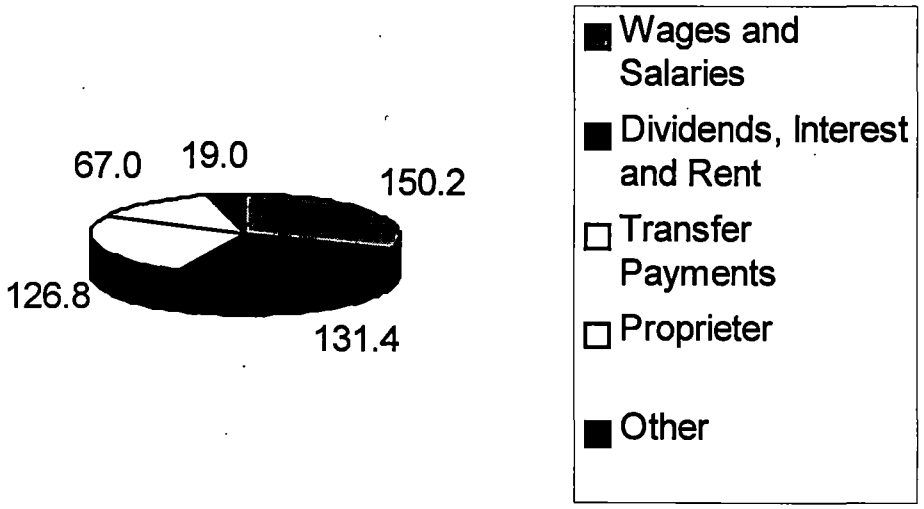

Figure 1. Personal income by source, in million dollars, for Ravalli County, 1995 (Source: Bureau of Economic Analysis).

The mountains surrounding the valley serve as an attractant to new residents because of their scenic beauty and proximity for outdoor recreational experiences

The size of the wilderness areas within the BNF have attracted wilderness enthusiasts worldwide as well as the attention of conservation biologists who have identified these areas as significant habitat for the expansion of grizzly bear populations. The presence of wilderness sets the stage for debates at the policy level over how humans can coexist with wild areas juxtaposed to extensive residential development and commercial activity. Having a large, active and growing population, particularly one with a tradition of agricultural and commodity resource use, proximate to extensive areas of wilderness, opens up difficult questions of accommodation and balance. For example, the needs of Bitterroot Valley residents for water has been a flash point in the tension between use and conservation, with dams and impoundments occurring in wilderness areas and demands for fishing and floating conflicting directly with other consumptive uses of water. How to maintain dams in wilderness has been the source of a particularly problematic debate in the last two years.

Management of wilderness to not only protect its natural qualities but also to provide opportunities for solitude and primitive recreational experiences in the face of a growing population and increased potential tourism development is another area of latent disagreement. The capacity of BNF administered wilderness to absorb increased recreational use at a time when grizzly bears are being considered for restoration could become the focus of new debates over land management.

Dramatic increases in human population place strains on the urban--wildland interface

Ravalli County maintains itself as the fastest growing county in Montana, with an estimated growth of 34% from 1990 -1997, to a total of about 34,000 people, a level above that predicted by McCool and Haynes (1996) in their projections of population growth in the Interior Columbia Basin and somewhat below the high projection computed by the Ravalli County planning office. Nearly all this population growth is due to net in-migration (above 90%). Much of the migration is due to retirements elsewhere, with the major population sources coming from Missoula, Flathead and Yellowstone Counties in Montana, Southern California and King County, Washington[3]. The importance of

[3] Bureau of Census annual county population totals for components of population change were used to estimate net inmigration. The comments on sources of migration

retirements to the population growth of the county has remained the same for three decades. The population growth occurs both within and near community centers as well as immediately adjacent to national forest boundaries. The rapid population growth near the forest boundary has occurred without significant guidance from a county planning document and has resulted in habitat fragmentation and both fire suppression and fire management difficulties.

The human wildland interface issue comes to the forefront dramatically in the Bitterroot Valley because of the rapid growth in population, the cultural differences between newcomers and long-term residents, the limited planning and social support infrastructure (schools, fire protection, road maintenance), and competing expectations for the use of public lands. There is also an ongoing and sometimes confrontational debate over the role of government and the appropriate reach of regulatory control. The nexus of highly valued scenic vistas and pristine areas, natural resource commodity processing, population growth and development provides for not only a convoluted policy environment, but one that is turbulent as well.

The natural resources management policy environment is characterized by lack of agreement over goals and methods

For over three decades the BNF has remained at the nucleus of controversy over forest management techniques. Beginning with the clearcutting and terracing policies of the 1960's, there has been little public consensus regarding the goals of management for the Forest; a lot of disagreement about the role of the Forest in providing commodities; and considerable uncertainty about the methods and consequences of resource management. The BNF is a component of a larger ecosystem that features a number of threatened and endangered species whose recovery impacts traditional commodity and recreational uses of the forest. These conflicts in public opinion not only mimic growing national public sympathy and interest in environmental values, but also shifts in the characteristics and environmental orientations in the local population.

A major implication of this policy environment is the ineffectiveness of traditional scientifically-based, expert-driven approaches to planning to resolve the significant conflicts over natural resources management. These approaches to planning have emphasized technical expertise over human values and interests, yet, many of the issues confronting the forest flow from significantly different social and ethical perspectives on natural resources management.

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are based on unpublished analyses of county to county migration files maintained by the Internal Revenue Service.

Federal funding for management of the BNF has not kept pace with demands or inflation in the last decade, forcing administrative reorganization, reduction in personnel, and shifting priorities

Reductions in funding have made contact with the public more difficult, expanded the job loading on forest personnel, and contributed to a growing frustration with the inability of connecting knowledge to action in forest planning processes. Increases in recreation use and visitor demands for services have stretched thin the agency capacity to manage the forest for these values. While budgets have been stable over the last decade (Figure 2), demands for the ecosystem-based goods and services provided by the forest have changed. Under such conditions, maintenance of a highly trained workforce with the skills relevant to the values at stake is increasingly threatened. Further, the work force is expected to become more actively engaged in community development issues and collaborative planning processes.

Accompanying reductions in funding for management have been changes in the mix of goods and services the public demands from the Forest

While the BNF at one time harvested 70 million board feet annually (instigated primarily by salvage sales following the Sleeping Child Fire of 1967 and national policy directives), this harvest has not been sustained. Currently, timber harvest levels have dropped dramatically, to less than one-third of the late 1980's level (Figure 3). At the same time, local publics have increased their expectations of amenity uses on the Forest. For example, recreational use of Forest lands and wilderness has grown dramatically over the last three years. This changing flow of benefits and uses not only reflects changing social preferences and values, but also strains the organization's capacity to manage, if only because the distribution of expertise on the forest remains relatively fixed. Too, funds may be allocated into the categories of work that are not the same as forest priorities.

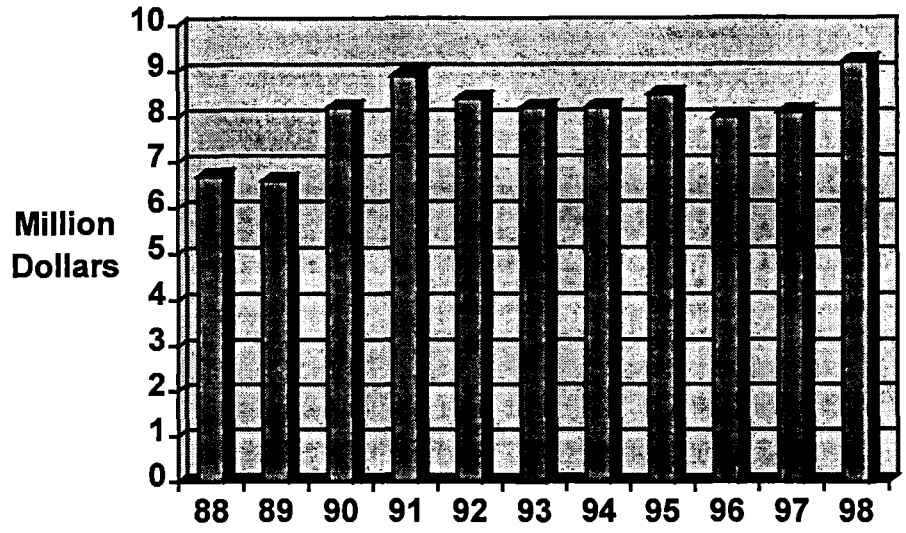


Figure 2. Bitterroot National Forest Fiscal Year Budget (Source: Northern Region annual budget advice).

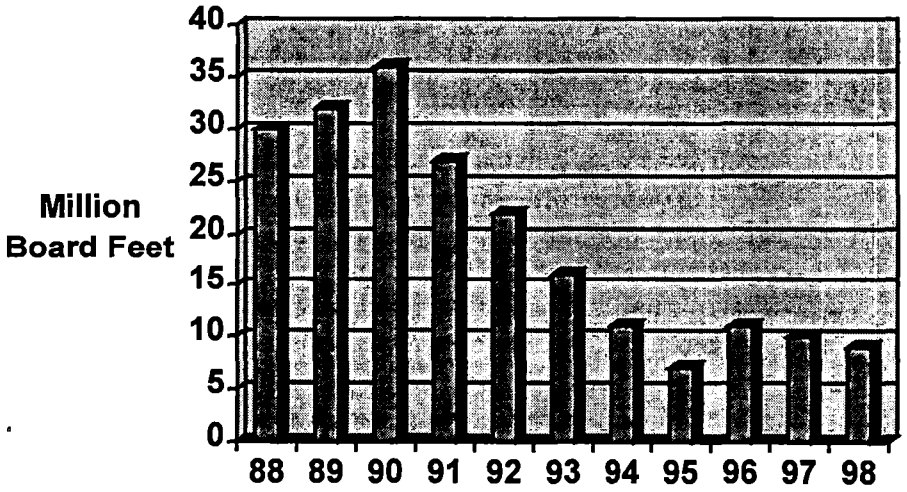


Figure 3. Targeted timber harvest by calendar year, Bitterroot National Forest (Source: Bitterroot National Forest).

Changes in federal land management policies over the years have created uncertainty about the direction that agency leaders may take

Interpretations of the Endangered Species Act (ESA), the National Forest Management Act (NFMA), and the National Environmental Policy Act (NEPA) have altered traditional management practices. New initiatives, such as ecosystem-based management and collaborative stewardship, have suggested fresh ways of managing natural resources, but have served to muddy the waters because of the lack of definitive descriptions. Collaborative planning has become a hallmark of responsive resource management, but is constrained by varying interpretations of public participation requirements of NEPA and the Federal Advisory Committee Act (FACA)., and lack of adequate funding.

Perceptions of the Forest Service and attitudes regarding natural resources management

People embrace different attitudes about the purposes of the National Forests

People residing within the Bitterroot Valley reflect the diverse attitudes of people across the nation about priorities for forest management. Citizens of the United States possess a range of cultural backgrounds, economic capabilities, and value orientations. As Blatner (1997) and others have observed:

> *Our nation has become more ethnically, racially, and attitudinally diverse...Differing values over natural resources that groups and individuals hold means that conflict is inherent in multiple use management.*

The contentiousness over the use of the BNF that remains today demonstrates the difficulty in accommodating the cross-currents of public desires within a pluralistic, democratic governance structure. Further, expectations for public lands shift as values evolve to correspond to changing societal conditions. The principles of economic opportunity and individual liberty, expressed by the classical liberal economists and political scientists such as Adam Smith and John Locke, have become a centerpiece of American political ideology. Simultaneously, the United States government was founded, and remains dedicated to the idea of equality, manifest not only in access to opportunity, but also in terms of the protection of the rights of future generations and non-human living systems. Sustainability, the noble goal of ensuring future generations have the ability to provide for their

own needs (World Commission on Environment and Development 1987), is at root an equity issue.

Frequently, the values expressed about the use of public lands revolve around both ethics and aesthetics, with the former an expression of right or just behaviors, and the latter a continuum of preferences of appearance, form, and function. Our collective land ethic has been shaped by our history, experiences, and sensitivities about the human place in the world, and is often described as a struggle between utilitarian (or human centered) needs and intrinsic (or naturally occurring) rights. The appropriate use of the world's resources by humans from the utilitarian perspective has been deeply influenced by 19th century ethicists such as Jeremy Bentham and John Stuart Mill, whose approach was adopted by Gifford Pinchot and summarized as "the greatest good for the greatest number in the long run." The importance of intrinsic values has been highlighted by two Americans, John Muir and Aldo Leopold, who have argued for an ethic of responsibility, where humans view themselves as mere members of a larger community of living beings (Bosselman 1994).

The aesthetics of land use have received less attention than ethical considerations, but are no less operative in people's impressions of appropriate management actions. An appreciation of natural beauty has been part of the human experience for millennia, yet it was not until the appearance of the work of 19th century landscape painters that a widespread model for the "picturesque" emerged (Callicott 1992). Interestingly, the term "landscape," so popular now among terrestrial ecologists, comes from the visual arts to describe a style of painting. The resulting influence of the arts, from Fredrick Church to Albert Bierstadt to Ansel Adams to Walt Disney, has created commonly held images of nature as grand and romantic. As Callicott (1992) comments, "Western appreciation of natural beauty is recent and derivative from art...It does not flow naturally from nature itself." Regardless of its origin, people expect that nature should appear in this picturesque form, a "landscape" that does not reflect evident human interference.

The Bitterroot Valley has been at the forefront of clashes over land ethics and aesthetics for the past three decades

In the first two decades after World War II, the management of National Forest lands for timber production was the dominant perspective guiding management operations (Hirt 1994). With an eye on maximizing wood production to support the demands of a booming post war economy, the Forest Service received justification and support for extensive roading, timber harvesting, and fire suppression. Yet by

the mid 1960's, people in the Bitterroot Valley were disturbed by the aesthetic of the large, terraced clearcuts on the flanks of the majestic mountains surrounding the valley. Bitterroot residents complained to Montana Senator Lee Metcalf that clearcutting and terracing for the regeneration of ponderosa pine was inappropriate under the multiple use doctrine guiding the management of National Forest lands.

Metcalf turned to his state's School of Forestry for an assessment of the situation. Under the leadership of Dean Arnold W. Bolle, one of the most significant challenges to long-standing management practices on the National Forests occurred with the publication of the report, "A University View of the Forest Service," otherwise known as the Bolle Report (Senate 1970). Bolle's report found that "Multiple use management, in fact, does not exist as the governing principle on the Bitterroot National Forest," and timber mining was a more apt description of harvest practices. Further, Bolle argued that "The Forest Service as an effective and efficient bureaucracy needs to be reconstructed so that substantial, responsible, local public participation in the process of policy formation and decision-making can naturally take place." The Bolle Report helped spur the passage of the National Forest Management Act (NFMA) in 1976, and along with a growing awareness of environmental issues nationwide, ushered in a new era of management priorities.

Although other laws regarding environmental management emerged during the same period as NFMA, the detailed requirements of the this law and its regulations opened the door to a host of interests to engage in a debate over the use of National Forest lands. As time progressed, additional knowledge about ecosystem processes emerged, yet the level of timber harvest remained the touchstone for controversy over the management of public lands. One side is typically identified as supporters of "commodity" production (reflecting utilitarian values), and the other side advocates "amenity" maintenance (representing intrinsic or non-consumptive values). However, as timber harvest levels have been reduced nationwide, those supporting commodity production have begun to adjust begrudgingly to the change in priorities. As one Bitterroot resident commented in a BEMRP research report (Thompson 1994):

> *The environmental movement won that battle. We're down to one sawmill. We cut eight million board feet off the Bitterroot National Forest this year...The timber products industry has not been effective in increasing the cut, and I don't think they ever will be... their role is going to be greatly diminished in the future.*

The Bolle report and its critique of the Forest Service remains relevant today in light of controversies on issues as diverse as the restoration of grizzly bear populations, the maintenance of the Tin Cup and Big Creek dams, and the potential for timber harvest practices on the Bitterroot front.

Residents of the Bitterroot Valley share an appreciation of certain lifestyle and resource characteristics, yet they are not in agreement about several significant forest management issues.

Both long term residents and newcomers share a love of the outdoors and the presence of natural amenities. Valley residents comment that they live in the Bitterroot because of its natural setting, to pursue outdoor activities, and to enjoy a rural lifestyle (Thompson 1994).

Although people in the Bitterroot Valley commonly identify forests as a fundamental component of the valley's character, they do not share a common vision of the priorities for forest management. Most residents agree that there should be additional attention given to the management of fish and wildlife species and adequate attention should be given to the protection of endangered species (Eiselein 1992). However, the potential introduction of grizzly bears into the Selway/Bitterroot area has stirred deep public controversy over both the intent of species recovery and the mechanisms for decision-making on species reintroduction. Residents are divided on the extent and location of timber harvests, although few are calling for the forest management practices of the past. There is also little consensus on the benefits of developing additional recreation areas (Eiselein 1992).

This presents a dilemma: people do not agree about specific objectives for the management of the forest, but they do share an appreciation for the area and its natural qualities. At one level, residents of the Bitterroot possess sufficient common interests to agree on the importance of sustaining natural resources so that they may participate in an annual rhythm of outdoor activities. At another level, there appear to be very different points of view on how to achieve this. (Thompson 1994) subdivided her informants into three categories of natural resources orientation – amenity, commodity, and neutral. Underlying these orientations are very different expectations on the manner in which resources should be managed to allow for the appreciation of the valley's natural endowments while supporting necessary local services and employment. Thus, the details of management, particularly as it relates to the manipulation of specific places, create deep divisions among residents of the valley. It should be noted that this dilemma is not unique to the Bitterroot, although the area's history and symbolism

in the generation of policy raise the stakes for those that observe community/forest relationships.

Compounding this dilemma is the recognition that managers and scientists do not always view management problems in the same manner as valley residents (Guthrie 1997). Managers and scientists relate to the landscape based on their technical experience and the demands placed on them from their parent organizations. Since complex institutional relationships have developed over time for jurisdiction over land and water resources, an attempt by a single private or public sector organization to operationalize its relatively independent mission frequently encounters resistance from other organizations. Since the values of organizations are not necessarily the same as those of the local population, agencies and organizations are mired in the details of making manifest something that is only sensed at an emotional level among citizens. The net result is an institutional incoherence in land management operations, with organizations somehow unable to support even those common values possessed by residents.

Although citizens desire the Forest Service to remain as an institutional presence in the Valley, there is uncertainty in the findings on the level of trust in the agency.

At a national level the Forest Service is viewed favorably by a majority of the population (Fredrick/Schneiders 1994), yet at various local levels there are concerns over the capacity of the agency to meet commitments and accomplish tasks. The echo of past management practices still resonates in the ears of many Bitterroot residents, who continue to express concern about the Forest Service promoting excessive levels of clearcut timber harvests (Eiselein 1992). However, local support for the maintenance of Forest Service offices in rural communities remains strong. When the agency attempts to consolidate its operations because of budget constraints, as it did in 1997 with the Sula Ranger Station, local residents line up to advocate for keeping their Ranger station.

Trust in the agency by local residents depends on a variety of interrelated factors – the personalities of Forest Service officials, the types of decisions that are made, and the processes used to engage people in a dialogue about appropriate actions. Trust in the Forest Service is tied to general popular support of government institutions in general. For many residents, trust in the agency has been broken because of complex institutional uncertainties. Since local officials are buffeted by higher level demands or constraints, they often cannot deliver in a timely manner on their promises. Multiple avenues are

available to overturn or delay decisions, and budgetary targets frequently become the major determinants of management action.

Typically, American citizens place higher trust in scientists than they do managers (Brunson, Shindler, and Schreckhise 1994). They also trust government officials at levels closer to home, such as county officials, than those at the federal level who are located in Washington, D.C.

Agency culture plays a significant role in management of National Forest lands

Personnel changes among Forest Service officials in the Bitterroot have been commonplace, yet since the 1970's a new cadre of professionals has begun to populate decision-making positions (Yaffee 1994). Managers with different disciplinary backgrounds and beliefs about public participation, for example, have replaced those with more traditional backgrounds and feelings. These new managers do not place the same weight on the traditional functions that had guided Forest Service management, and different mechanisms for public participation in decision-making have been attempted. People who have resided in the Bitterroot Valley in different periods over the last century relate to the agency based on the initial onset of their relationships and the agency culture that was operational at the time (Gebhardt 1995).

People's attitudes about fire are mixed, with some suggesting that it be allowed to support ecosystem function, and others advocating the utilization of all merchantable wood products at risk from fire

In survey research of residents of the United States, 55% thought that the Forest Service should suppress all fires (Fredrick/Schneiders 1994), although others suggested that fire plays an important role in ecosystem functions. In extensive interviews with informants in the Bitterroot Valley, roughly two thirds of those contacted felt that fire should be allowed to play its natural role, while around one quarter suggested that any useable forest products should be captured for the market instead of "wasted" by burning (Thompson 1994).

The restoration of fire to forests as a fundamental disturbance element is being attempted by managers within the context of uncertainty about public concerns surrounding fire. Changes in national policy are implemented at the local level, but in-depth research to better understand the social consequences of a reversal in a half century old policy are poorly understood. There are a number of different dimensions of this policy including the perception of risk, the effectiveness of treatments, its cost, the health and aesthetic effects of

smoke, the dissonance or confusion over the campaign to suppress fires (symbolized by Smokey Bear), and the anticipated beneficial effects of fire in western ecosystems.

Fire in the urban-wildland forest interface is an area of concern to planners and rural fire departments; but people in the valley are largely intolerant of the smoke that both wildfires and prescribed fires bring

The origin of concerns over the urban-wildland forest interface is not well understood. Many rural residents have little idea that they are at risk from wildfire, although scientists and managers are deeply concerned about the issue. Too, many residents are intolerant of timber harvesting that might be used to reduce the likelihood of catastrophic fire. This raises the larger issue of communication among different groups – scientists converse with their colleagues, but they are not able to reach out with their message to a broader audience, although the BEMRP project has encouraged scientists to take their knowledge directly to the public. People function in isolation from one another, occupying different realities, but living in the same place. Planners are worried about something very different from what the public is worrying about. In addition, newcomers are interacting in much different circles than traditional residents.

The growth of the population in the Bitterroot valley, particularly on the western side of the river, causes great concern among fire suppression specialists that people will face threats to their homes from wildfires that originate on forest lands. Local fire departments are unable to provide fire suppression coverage for the new homes that have been constructed in places where roads and water limitations obviate suppression operations. A local group of citizens, called the "Fire Interface Group," has been organized to offer community-level education on fire risks, and it is run by volunteers with the support of the Bitterroot Resources Conservation and Development Council (RC&D) and the Forest Service. To reduce wildfire risk and return low-elevation forest stands to a condition where stocking reflects historical tree densities, thinning and prescribed burning operations have been initiated at a modest scale. Canton-Thompson (1994) did not find a high level of tolerance of smoke among any of the informants in her social assessment of the Valley. In fact, most respondents were strongly opposed to smoke emissions, as following statement concerning smoke from the 1988 fires highlights:

> *In 1988, I think I complained about it more that anybody, but I felt like I just wanted to crawl on the floor... I just didn't even*

want to stand up (because) it was so bad. That's when I left and went to LA so I could breathe.

People use the forests in the Bitterroot Valley in different ways

The forests in the Bitterroot Valley have been important to people for many purposes over the course of history. Typically, direct, consumptive uses of the forests - for game, fuelwood, recreation sites, or timber harvests - have been a primary focus of managers who consider the options for the types and distribution of benefits from forest lands. These uses reflect the strong, continuing relevance of a utilitarian point of view, that forests are important to meet the needs of the human economy. In recent years, however, more indirect, non-consumptive uses of forests have emerged as a powerful force in guiding management decisions. People "'use" forests in ways that do not demonstrate a direct interaction with the forest, but the "products" of the forest - its appearance and its ecological functions - remain valuable. This is particularly important in the Bitterroot Valley, where the scenic backdrop of the Bitterroot front encounters residents on a daily basis. As one resident commented to a researcher, the Bitterroots are his "emotional backyard." Recognizing the importance of these difficult-to-measure scenic and aesthetic contributions to the Bitterroot National Forest is an important factor in decision-making.

Prior to 1970, the traditional practices of land use in the Bitterroot Valley focused on agriculture and timber harvest. With an influx of newcomers in the 1970's and again in the 1990's, new voices may have been given to environmental values. And new land uses have emerged., as have new land uses. Canton-Thompson (1994) comments, "the Valley's most popular land use is rural residential, meaning a homesite and small acreage." The influx of newcomers has been going on for three decades, yet there remain significant questions about whether newcomers differ in attitudes toward public land management from oldtimers (Smith and Krannich 1998).

Much like the pattern of uses on National Forest lands across the nation, driving for pleasure, sightseeing, and wildlife observation are the most popular recreational uses of the Bitterroot National Forest. Fishing and hunting are common activities, as is camping. Although grazing occurs on the Forest, less than 1% of all users are engaged in grazing activities. Over half of the Forest visitors have gone into designated Wilderness areas. A typical forest visitor has taken part in seven different kinds of forest uses (Eiselein 1992). In addition, other forms of use, such as firewood gathering, berry picking, hunting and subsistence harvesting are important to local residents, but are frequently undocumented.

Relationships between the BNF and its publics

As forest planning and management have proceeded over the last decade or so, the inadequacies of scientifically-based, expert driven approaches to planning have come to the forefront. These approaches have often emphasized technical data and concepts over local, experiential data, and implicitly assumed consensus about goals and scientific certainty about cause-effect relationships. The focus of these approaches has been the engineering of solutions, rather than learning about processes, content and relationships. And, there was little room for constructive public input on alternatives and techniques. These approaches have typified all of natural resource management and planning, not just what has occurred on the BNF. However, the turbulent nature of the policy context serves as notice that there is continuing disagreement about management of forests, and scientists, particularly as they have moved to larger spatial scale planning, are increasingly uncertain about consequences of proposed management--what they are, when they occur, who and what will be affected, and how they should be mitigated or enhanced.

Such conditions suggest that planning be adaptive and that public values be brought into discussion early in planning processes. To some extent, both NEPA and NFMA recognized the importance of public contributions to decision-making, but what has also changed is broader recognition of public participation in those decision processes beyond identifying social acceptability of alternatives.

Relationships with the local publics have varied over the years

Gebhart (1995), in his review of public participation in BNF planning and management, identified three periods with distinctive relationships with the public. To that typology, we have added a fourth, based on new paradigms of ecosystem-based management. In each of these periods, with the exception of the last, public participation was often viewed as a response to agency initiated proposals that were based on science and driven by a mechanistic, engineering view of planning (Friedmann 1993). As such, during these first three periods, while there were different formats for participation, the public reacted to plans, but did not help build them. Public participation was viewed as an addendum to planning, not an intrinsic component of it.

The first era could be termed "the informal period" and existed prior to 1960. During this time, there were no formal statutory or administrative requirements for interacting with the public although agency actions were guided by the Administrative Procedures Act of 1946. In this era, public participation was conducted informally with district rangers, the

forest supervisor and other Forest Service personnel. At this time, the mix of goods and services demanded by the public was apparently consistent with how the forest was managed.

Following the Multiple Use-Sustained Yield Act of 1960, there was an apparent interest in elevating participation to a more formal level. While the Act did not require such formalized involvement processes, growing competing expectations and uses of the BNF required some attention to public participation procedure. This era lasted until passage of the National Environmental Policy Act of 1970 (NEPA) and encompassed the clearcutting and terracing controversies that brought national attention to the BNF. As Daniels (1971) noted, much of this controversy could be attributed to how the BNF interacted with its publics.

A third era focused on gaining public participation through application of administrative procedures mandated by such legislation as NEPA, NFMA, RPA and other statutes. The Administrative Procedures Act in 1946 had previously opened up public engagement with federal officials but had not formally required participation as a component of land management planning. In this era, public participation was carried out in a formal, but minimalist nature, with the public interacting primarily in response to scoping needs required in the conduct of environmental assessments, and in assessing preferences for alternatives. Public participation was guided primarily by attention to procedural requirements to "bullet proof" decisions.

The final period could be described as one emphasizing collaboration and learning. Collaborative processes have frequently been defined as critical components of ecosystem-based planning (e.g., Cortner and others 1994) and attempts have been made since 1992, at least on the Stevensville District, to engage the public in significantly different ways than in the past. While this stage could be characterized as an experimental one, it represents a significant departure in the process of how the BNF engages its publics. We note that this stage is ongoing at the current time, and would expect further experimentation with techniques and methods of public participation.

The scientific-based, expert-driven model of natural resource planning has dominated, until recently, the ways in which the public could interact with the Forest

This model, which permeates virtually all natural resources and environmental management, is well documented in the public policy literature. While the causes of conflict over management are rooted in differing definitions of goals and acceptability of management

practices, the conflict was exacerbated by this model. Even ecosystem-based management, although nominally a "collaborative" process, still focuses on the superior perspective of "science" (e.g. the continuing call for "scientifically sound decisions"). This model of scientific dominance has made human/forest relationships even less transparent to members of the public, as the science tools, such as simulation models, have become progressively more complex to deal with ecological processes at larger spatial and longer time scales.

Acknowledging and understanding the complexity of ecosystems (over long time frames and large spatial scales) is a difficult leap for people to make, but to characterize these complexities with tools that are inherently impervious to interaction, such as computer models, makes the public even more frustrated than before. The trust between the agency and the public becomes even more important in this setting--that people believe the scientists know what they are doing. For example, when stochastically based processes are mapped and show one single error (an area where there may be personal knowledge), the entire scientific modeling enterprise may be discredited. The emphasis on bio-technical science in a values dominated discussion and planning process may not provide a sufficient basis for resolution of issues and questions.

To some extent, the public pilot-testing of models interfered with goals of greater public involvement. But the fact that such models do require input in the form of identifying scenarios and important values suggests there are significant opportunities for public involvement, assuming scientists desire more comprehensive participation.

The minimalist approaches to public involvement required by NEPA have been inadequate to create an environment for learning and development of public understanding; BEMRP research shows that the public, managers and scientists benefit from more comprehensive views of public involvement

Given the dominance of the scientific model of planning, foresters thought that if people could be "educated", support for management actions would develop. Such support was never forthcoming, and thus the BNF remained a cauldron of conflict. Because NEPA has largely been adopted by many agencies as a mechanistic approach for public interaction (when to contact people, how to respond to comments, how to appeal), it dehumanized processes of participation, created suspicions that decisions are made *a priori*, and reinforced perceptions that NEPA is only window dressing, not a legitimate analysis process. The NEPA process absorbs a tremendous amount of agency energy to stick to procedures and to attempt to "bulletproof" decision documents.

While the minimalist interpretations of NEPA driven public involvement have characterized a lot of federal decision-making, recent efforts on the BNF have often gone beyond this approach (e.g., Guthrie 1997). More extensive public involvement has been helpful in identifying the value of different techniques and approaches, and has clarified the nature of the task. In particular, by emphasizing learning as a goal of public participation, agencies can enhance their relationships with the public.

Research has shown that the obstacles to more authentic public involvement are many, complex and difficult to overcome

Gebhardt (1995) noted many different obstacles to authentic public involvement in his review of the literature. We observe that it is often difficult to determine which set of obstacles may be operative in any given situation. And, the scientists, managers, and publics involved may be operating in differing public involvement realities, with distinctive and potentially conflicting definitions of public participation, measures of success and perceptions of barriers (Guthrie 1997). The tools most effective in addressing these obstacles are not necessarily self-evident. To some, barriers may be viewed as simply operational issues while to others such barriers may be more systemic (Caldwell 1990).

Venues for dialogue and deliberation are critical to creating understanding and potential consensus about management actions

The shift to ecosystem-based management (with its call for collaborative processes) occurred during a period of growing dissatisfaction with the mechanistic, procedurally based public participation processes of the NEPA era, resulting in a search for methods and measures of successful public participation and questions about the appropriate relationship with the public. Many authors, both those writing about the BNF and others, generally conclude that a significant improvement can be made if venues for dialogue, deliberation, and learning can be established (e.g. Gebardt 1995; Krannich and others 1994; Yankelovich 1991; FEMAT 1993; USFS 1994).

Basic principles of such processes require they be inclusive, focus on issues and active learning, ensure equitable access to information, and emphasize cooperation over confrontation. These processes must necessarily begin with a search for what values and definitions are shared among participants. Yet, in the context of the Bitterroot Valley

applying these principles is difficult, given the widely varying interpretations of the roles of government.

The BNF now has several objectives for its public participation program (Richards 1998), which recognize the many difficulties intrinsic to engaging the public in meaningful, constructive dialogue. These include:

1. promoting cooperation and clarifying people's realistic and idealized expectations of public participation
2. relating management goals to management practices on the forest and in local communities, and identifying those institutional arrangements that are most effective in implementing land management decisions
3. securing a representative, consultative audience, and clarifying how completely valley consensus/collaborative groups represent local, regional and national attitudes about land management decisions
4. promoting civil discourse and recognizing the attributes of, and barriers to, effective public participation
5. adapting communication methods to different information needs and perceptions of those public groups that may participate in forest planning.

Several "experiments" in public participation have been tried, with varying degrees of success

The BNF has engaged in several types of public participation programs that depart from the minimalist, procedurally oriented norm. First among these was its participation in development of new management direction for the Selway-Bitterroot Wilderness through the use of a citizen's task force working along side professional managers. This process began in 1987 and continued into the early 1990's, although, unfortunately, no formal evaluation of its success was conducted. Another "experiment" was initiated in 1992 with the Stevensville Southwest and Westcentral planning units. These planning processes proceeded with frequent public information, consultative and participation meetings, numbering about 40 and were followed by a formal evaluation .

Table 1. Characteristics of effective public participation (Source: Richards and McLuskey 1997)

1.	Cooperation is enhanced when Forest Service officials with decision-making authority join in the process
2.	Cooperation and realistic expectations are more likely to be fostered in small groups than large ones
3.	Encourage opposing groups to talk with each other about commonalities rather than differences
4.	Forest Service officials should not negotiate differences between opposing groups and avoid directing groups toward common issues.
5.	Free expression of ideas, concepts and perspectives should be encouraged.
6.	Focus on issues first that can be resolved, build on these agreements for the more intractable ones.
7.	Agree to disagree when appropriate to encourage collaboration over consensus
8.	Encourage participants getting to know each other on a personal basis.
9.	Recognize that personalities and informal interactions may override more formalized processes
10.	Encourage participants to capture and foster a sense of community
11.	Achieving short term goals is important to maintaining group cohesion
12.	Achieving some success quickly helps deal with participant "burn-out"
13.	Focus on issues that have tangible meaning to participants
14.	Representation occurs more effectively when individuals represent themselves (and their values) rather than as a member of a specific group.
15.	It is not possible to completely separate participation from more formal political interests
16.	Public participation can become derailed when outside political influences intrude into the group.
17.	Understand informal norms of group interaction and history of interpersonal and intergroup relationships.
18.	Promote civil discourse through a facilitator
19.	Civil discourse does not allow extreme positions to be accommodated
20.	Participants should know how their input will be considered and used.
21.	Input should be used consistently throughout the process
22.	Involving participants early in the process to ensure successful communication

dialogue, learning and collaboration is a fundamental feature of public participation may have yet to be recognized. It doesn't have a beginning and a discrete end, and to be effective over the longer time frames of ecosystems doesn't just focus on a single issue. The procedural model of NEPA reinforces the belief that if a step is completed, then additional action or communication is unnecessary, although recent BNF processes have not taken this position. This is especially true in a highly dynamic situation, where the resource conditions and the people change. As Ackoff (1974) once stated, problems never stay solved, because the context is always changing. Thus, the commitment to an ongoing, communicative, learning process is ever more relevant.

Although the effort to engage the public with frequent meetings (in the Stevensville planning processes) was an honest attempt to solicit a broader range of ideas and interests, the number and frequency of the meetings became overwhelming to both the public and planners. Additional research on an appropriate amount of commitment from people in terms of their time and energy is warranted.

There is growing recognition that successful planning in natural resources management is multi-dimensional in nature, and may only be able to be assessed over a longer time frame

Since managers deal with messy problems (where goals are contested or not specified and scientist disagree) and not tame ones, success goes beyond plan implementation and on-the ground changes. A fundamental cause of failures in plan implementation is an inappropriate model of planning, involving use of approaches appropriate to tame problems when planners are confronted with messy situations. In messy situations, successful planning involves affected publics in qualitatively different ways than in the past and must account for how different forms of knowledge will be used and incorporated into the plans, deal with uncertainty, and integrate different values. Often, the values which are the most important to people are the ones most difficult to identify and deal effectively with (FEMAT 1994). Planning success (Guthrie 1997) may be measured by the extent to which:

A. a plan is completed
B. the plan is implemented
C. the plan has social and political acceptability
D. the planning process allowed varied interests/values to be represented
E. learning on the part of involved and affected scientists, managers and publics occurred

F. relationships among affected groups were enhanced

Consensus building, a frequently mentioned objective of public participation in messy situations requires certain conditions to be present, which are sometimes difficult to develop

Messy situations require not only that efforts at planning be carried out jointly with affected publics, but that some degree of consensus be developed, for without consensus, there is a good chance some group or interest will "veto" the plan.

Research (McCool and Guthrie 1998) on the Stevensville Westcentral Planning Unit suggested that the development of a consensus about a proposed natural resource action required the following conditions:

A. common agreement on the problem definition and goals
B. equal access to information concerning the problem
C. agreement that public participation is appropriate to resolve the problem
D. a willingness to "go along" with proposed resolutions to the problem
E. inclusive of affected interests
F. permission for the agency to act

If consensus is an idealized outcome of collaborative processes, then public participation techniques need to address the above conditions.

There are a variety of models of public participation processes from which to choose when determining relationships with the public (Richards and McLusky 1997). However, the choice of process is largely influenced by the nature of the problem and the ability of planners to convince participating publics in a low-trust, socially complex environment that the planner will use the input. Each of these models has varying relevancy to these types of environments:

One such model is the mechanistic, procedurally based one, where the agency consults with the public in making a decision on an action. In this model, which may be appropriate in some situations, the public is informed about a potential decision and responds to agency proposals. Another model is a "collaborative" one, where decisions are made jointly in public with the public. There is a great deal of research on-going nationally about such models, but significant questions about delegation of authority and accountability remain. A third model is

cooperative management where the principal stakeholders are delegated the principal decision-making responsibility. This model appears to be underlying the preferred alternative for restoration of grizzly bears in the Selway-Bitterroot Wilderness, where a citizens committee may be given responsibility for management decisions. The extent to which this model will create institutional conflict in management of the wilderness will be an interesting process to observe. Finally, public participation could proceed on a relatively intimate basis, with the public involved at all stages of planning, providing the type of input needed at the point it is required in the planning process. The Selway-Bitterroot Wilderness Task Force of the late 1980's followed this model, a variant of which was also employed in the Stevensville Westcentral planning process.

Several criteria are important in designing a model of public participation (Richards and McLuskey 1997). Each criterion must be examined in terms of its ability to meet the substantive objectives of a public participation program (see Table 1). However, trust, mutual respect, perceptions of management, and other items in this research are really about how the agency may conduct planning. People want to participate toward a given end, and know their efforts will bring some reward, either in terms of a direct outcome or a model for allocating resources for the future. This becomes the challenge for the planner in a low trust environment: that there is a clear purpose for the public participation exercise.

Use of complicated resource management models and technology to clearly communicate ecosystem concepts and applications is a significant challenge

The move to ecosystem-based management has required managers and publics to think at larger spatial and longer temporal scales. It requires consideration of how scales are nested in a hierarchical sense. Communicating complex technical information about ecological processes, human-environment linkages and multi-scale consequences is difficult; the tools and computer programs that scientists use may not be appropriate as a basis for communication in public settings (Freimund 1998). Thus, communicating with the public about scientific and technical information is made more difficult by the change in scale of thinking and by the technology used to communicate data and concepts. In a low-trust environment, the public must further trust scientists (who are often unable to clearly communicate in public settings) that the models and approaches have validity. While the public may respond positively to the presence of scientists in the planning process, they reserve judgment about scientific information until they see things happening on the ground.

The role of the Bitterroot National Forest in meeting recreational and quality of life needs

Outdoor recreation in the BNF has a profound role for Valley residents and forest managers

It is clear that outdoor recreation within the BNF is a critical aspect of the Bitterroot Valley lifestyle. More than half of the residents in the Bitterroot Valley used the BNF during 1991-92 for what were dominantly recreational activities (Eiselien 1992). Their most popular activities were driving, looking at scenery, and viewing wildlife and birds. Of that group, nearly half used the wilderness component of the Forest. This local use is augmented by a significant amount (as much as 40%) by nonresidents (Yuan and Hammond 1991). The recreational values of the BNF, therefore, play a significant role in the lifestyles of the people who live near the forest and also provide recreational benefits, particularly those in wilderness, to a much broader audience. The presence of the nonresident visitors also contributes to the local economy and is often linked to a visit with a resident. The BNF is a place where people recreate alone and with others, directly and indirectly.

The Bitterroot National Forest supports a wide variety of recreational opportunities with unique potential for primitive recreational experiences

Visitors to the BNF can utilize highly developed settings such as ski areas or visit pristine wilderness. Traversing these setting are numerous opportunities for camping, fishing, hiking, off highway vehicle use, camping etc. The BNF manages this continuum within the framework of a recreational opportunity spectrum, attempting to provide for diverse demands while maintaining the full range of settings. With 47% of the BNF in designated Wilderness, the Forest has a unique opportunity to provide primitive recreational settings.

When residents were asked about the issues and concerns by A and A Research in 1991, it became apparent that while the residents feel there was currently a good mix of uses on the forest, they desired less logging and more emphasis on wildlife conservation and wilderness values. These desires also extended to their recreational demands on the resource and were manifested in strong (72%) disagreement with making more areas "available to motorized recreation such as snowmobiling, motorcycling and off-road vehicles" (Eiselein 1992).

Assessments of public perceptions of relationships between logging and recreation have not been conducted.

The Bitterroot National Forest visitation levels appear to be increasing but measurement techniques only allow for crude estimates of change.

Selway-Bitterroot Wilderness use in 1976 was estimated to be approximately 196,000 recreation visitor days (Lucas 1980). This same number is reported for 1995 for the Bitterroot National Forest component of that Wilderness area and use was approximately 66 percent above the projections in the forest plan in 1995 (Forest Plan Monitoring and Evaluation report, 1995). Since 1987, use levels hovered just below 100,000 RVD's until 1994 and 1995 when use levels climbed again to the 1976 level.

Non wilderness recreation has constituted sixty to seventy percent of the recreation use in the BNF. The recreation in these areas also have steadily increased since 1987 rising from 261,000 RVD's in 1987 to 355,000 in 1994 and 1,311,000 in 1996. The significant increase between 1994 and 1996 is primarily due to a decision to include pleasure drivers into the RVD calculations. Non wilderness use is not comparable to the forest plan projections since the formula for measurement has apparently changed.

Forest managers attribute increased popularity of the BNF to increased population within the Bitterroot Valley and the success of marketing techniques (USFS 1995). It is likely that this explanation is partially correct. The growth of recreational use within the wilderness area, however, is consistent with use levels in the National Wilderness Preservation system at large, which appeared to level off during the 1980's and began a steady increase in the 1990's (Cole 1996). Additionally, Hammond and Yuan (1992) found that friends and relatives remain the dominant information source about places to visit in the BNF representing the primary source for fifty-three percent of the residents and fifty-six percent of the nonresidents. These issues, coupled with the difficulty in accurately assessing visitor use (Cole, 1996), suggest that the ability to predict or fully explain use levels is questionable given the existing data.

Recreational pursuits on the BNF will continue to diversify

The USFS (1995) documents increasing interest in winter recreation including skiing, snowmobiling, driving for pleasure, and off-highway vehicle use. This is consistent with trends at the state and national level. Favinger and Trent (1993) assess the use trends in Montana relative to the US and agree that public demand for a variety of experiences will

continue to heighten in Montana. They further estimate that values will broaden and that desires for authentic and culturally relevant experiences will see increased popularity. Retracing the Lewis and Clark expedition (which has its bicentennial celebration in a few years), for example, would fit into this description and could have implications for use levels on the BNF. Adding diversity to the values recreationists hold and experiences they desire will increase opportunities for conflict and suggests increased sensitivity to the recreationist's perspective when planning for the forest or implementing management decisions.

Convenient access to the forest is an important characteristic to residential visitors followed by scenic beauty

Where on the BNF a Bitterroot resident recreates is largely influenced by the convenience of the location (Hammond and Yuan 1992). The next most important factor was the scenic quality of the site. This pattern of site choice has obvious implications for the need to watch development patterns in the valley but in addition may reinforce the reasons that many people are moving to the Bitterroot Valley to begin with. Not only is a wide range of outdoor recreational opportunities available within the BNF, they are largely accessible and within an hour's drive for most residents. While most of the areas within the BNF are deemed scenic, there are many areas that are particularly attractive.

This importance of convenience does not suggest that people are likely to substitute other areas for their recreation without significant changes to biophysical or social conditions. This may also lead to a reduction in access as people move closer to the boundaries and develop current access sites. It could also lead to an increase in use in currently low use areas, and increased use in already highly used areas. Without a clearer understanding of the relationships between migration patterns and motivations for moving to the valley, it is difficult to speculate on the potential impacts of a rising residential population.

There is considerable potential for conflict among increased use, environmental impact and reduced management capacity in wilderness.

As stated earlier, use levels on the BNF are increasing and are far above projections. It has been additionally documented that impacts to the higher alpine environments are occurring as a result of recreational use. Cole (1993) describes a 57% increase in the number of campsites that occurred within three drainages on the BNF between 1977 and 1989. His findings also suggested that the greatest proliferation occurred in moderately rather than heavily used areas within the drainages suggesting that as use levels rise in low use areas, numerous impacts could occur quickly. Previous attempts to cost effectively rest

and restore overly impacted campsites sites on the BNF have been ineffective (Cole and Ranz 1983). Attempts to redistribute use through the use of brochures have also had little effect (Lucas 1981). Finally, research on the use of signs and informational appeals demonstrate a sound challenge to the research community to learn how to make them more effective (Cole 1998; Cole, Hammond, and McCool 1997).

These finding suggest a potential need for greater rather than less management attention to the conditions of recreational destinations within the BNF. This occurs at a time when financial resources for these efforts are declining (USFS 1995).

Recreation research on the BNF has been influenced by geographic convenience and without a program of inquiry.

Much of the recreation research the BNF has been the result of the close proximity to the USFS Wilderness Research Unit in Missoula. With the exceptions of the evaluations of campsite closures and brochures, and a 1992 visitor study, there has been little research sponsored by the Forest to better understand recreational issues. Although the majority of the research has occurred in Wilderness, and the local service area has underscored a desire for managing more wilderness values, no research has addressed wilderness values since 1976. Studies that have been conducted in the BNF have focused more on the testing of more generalized hypotheses of recreation behavior (e.g., propensity to stop at signs) or recreation caused impacts (e.g., trail erosion).

The role of the Bitterroot National Forest in local economic development

An economy in transition

The Bitterroot Valley has a long history of boom and bust economies and is currently experiencing a dramatic set of economic and social changes. In the past 30 years, the mainstays of the traditional economy (extractive industries and agriculture) have either hit a plateau or declined, while other forms of income generation (such as tourism and information services) have increased by nearly three fold (Deuel and others 1997). Timber harvesting levels that often exceeded 60 million board feet per year from the 1960s through the early 80s are now closer to 10 million. The ranching industry that defined the tradition of the Valley for generations now comprises less than 5% of the Valley's economy. These changes have affected the lifestyles of many of the traditional valley residents. Many of the jobs related to these industries

are gone, forcing people to move, change vocations, commute for work or rely on welfare programs.

Simultaneously, the Bitterroot Valley has also become a prime destination for people who are looking for a place to retire, a way to escape Missoula or an environment in which a cottage business can be developed. As a result, the social demographics of the area have changed dramatically. The population has increased dramatically and re-shifted within the Valley. Deuel and others (1997) state that "In 1990, nearly half of the population had moved into their current house within the past five years." This trend provided a great boost to the housing and related construction economies. One down side of this growth is that the taxable property values of within the valley increased by 45.2% between 1992 and 1997.

The current job structure is dominated by services, retail trade, government and manufacturing (which includes wood products procesing) respectively. Approximately 19% of the Valley residents are working outside of the county and with the largest income source being investments and retirement accounts, much of the income for the Valley is generated outside of its boundaries. This loss of work related income coupled with a rise in demand for public services leads to increasing difficulty with providing the public services demanded by an expanding population.

This economic situation is one of great uncertainty. While the area is becoming increasingly popular, income generation has not kept pace. While the industries that have traditionally framed much of the Valley's character are diminishing, it is that very character that attracts many of the in-migrants. The pace of change poses perhaps the greatest challenge.

This transition not only poses a serious challenge for residents of the valley, but also raises significant questions about the role of the BNF in this transition. Does the BNF have a role? What type of role should it have? Are there similar perceptions among valley residents and Forest staff about what these roles are? Since the BNF contains a concentration of high quality wilderness and recreational opportunities, a particularly intriguing notion has been development of tourism in the valley.

There is mixed support for the development of the tourism industry within the valley residents

While nearly half (49%) of the Valley residents agreed that the positive affects of tourism outweighed the negative aspects, a substantial portion (33%) disagreed with that statement (Menning 1995). More agreement is found in defining tourism as a balanced component of an economic profile that includes manufacturing, forest products, agriculture and retail trade.

People who support tourism tend to agree that it encourages investment in the local economy and provides many worth while employment opportunities with minimal burden on the Valley's services. Negative perceptions include concerns over environmental degradation, and lower standards of living and quality of life. There is very balanced agreement and disagreement with issues of crowding, crime and whether tourists pay their fair share for the services they use.

The BNF remains near the center of the county's economic potential

The Bitterroot National Forest is the dominant land owner in the Bitterroot Valley. As such it interacts with the Valley's economy in many ways. The BNF has an annual budget in excess of 10 million dollars, much of which goes into the local economy. This transfer occurs through direct payments to counties, PILT moneys, employee salaries and the acquisition of goods and materials, and contracts with local businesses. The BNF also draws commerce into the area by being a center of communication for numerous forest issues and serving as host to numerous professionals.

Much of the service industry is also based on the amenities and recreational opportunities that are within BNF stewardship. These resources not only draw migrants but also numerous tourists. Tourism development is within the discussions of virtually all community planning activities that are currently in progress.

Cross-Cutting Conclusions

While we uncovered about two dozen studies conducted in and about the Bitterroot National Forest, we were struck with the general lack of focus, with the exception of the studies conducted on public involvement, of social science research. We were also surprised that more research had not treated the wilderness and wilderness values present on the forest. This situation may be normal in natural resource agencies where social science research has not been a high priority, and

where the agency (the BNF in this case) does not have a research responsibility. (We note, however, that there is a responsibility for monitoring of public lands and activities.) Public land management issues are generally cast in bio-technical terms, with scientific effort focused primarily on developing knowledge about the biology and natural processes occurring on the forest. That these questions occur within a larger context that impacts their definition and resolution is infrequently recognized.

Given the contentious nature of management of the BNF, we are, never-the-less somewhat surprised at the absence of research given the stakes involved. Only a few social scientists have ventured into this cauldron of conflict; their efforts may or may not have been useful to management, but an organized research program could be. In reviewing the research, we were struck by three primary conclusions that seem to appear from the data. We present these conclusions here, not only because they are significant for this report, but also they form the basis of a potential research program.

Techniques of dealing with contentious resource management issues are not well developed

Despite the long history of conflict and controversy, not only in the BNF but in many other places as well, our level of knowledge about how to effectively deal with this situation and successfully resolve issues is limited. Our knowledge of dispute resolution approaches is expanding rapidly, but few of these approaches are directly integrated into natural resource planning processes. More often, dispute resolution and public participation are viewed as mitigative rather than preventive measures, but such perspectives probably exacerbate the potential for conflict.

Within the Bitterroot Valley, a number of processes (such as the Bitterroot Water Forum, revision of the forest plan. county planning processes) addressing conflict are proceeding more or less simultaneously, with varying amounts of overlap in the topic and participants. These processes are generally moving along at different geographical and temporal scales and with overlapping objectives. The issues these processes address have varying degrees of definition. Their resolution has uneven amounts of public acceptance. The role of the USFS in these processes remains yet to be unequivocally defined. These uncertainties give rise to a number of questions about the role of the USFS, given its dominance as a land owner in the Bitterroot Valley. An important question is the extent to which strategies to deal with conflict have moved from cooperation to confrontation.

Few natural resource managers receive the basic conceptual skills in conflict management in university professional forestry or wildlife education programs, which generally concentrate on the technical aspects of land management. Yet it is these skills that are required for resolution of conflict at the point where it occurs. While there is a growing set of academic programs in conflict and dispute resolution, many of these are not located within or operated in conjunction with resource management programs in universities. Yet, the demographics of Forest Service personnel, with little recruitment of recent graduates, may exacerbate this issue.

Management of public land resources occurs within an enlarging and dynamic context

The Bitterroot Valley is representative of many other locations in the West, where conflict over natural resource management and high population growth rates exist. But in the Valley, grizzly bears may be juxtaposed to high density residential development; wilderness is adjacent to timber harvesting areas as well as rapidly growing urban centers, and availability of water from the BNF for domestic, agricultural and instream uses is problematic. The Bitterroot Valley is on the forefront of natural resource policy development, and is at the cutting edge of conflict.

Much of the personal income for residents in the valley comes from dividends, interest and pensions, some of which may be vulnerable, not to the local economic situation, but to national fiscal and monetary policies that impact interest rates. The rate of population growth in Ravalli County is ranked 53rd in the United States in more than 3,000 counties. This growth rate is phenomenal, and conflict over natural resources, county budgets, school funding and highway construction could only be perceived as inevitable within these conditions. Dealing with the transition between a small agricultural rural setting and a suburban ranchette livestyle is challenging. It is dynamic, and it is unpredictable. How demands for the resources of BNF will rise, shift, move and change is unclear, yet management must proceed.

Not only are the people residing in the valley changing, but the rules by which public land planning occurs are also changing. For example, a committee of scientists is currently engaged in a review of the NFMA planning regulations. Newly established stewardship contracting authorities may change how forest management may be implemented.

While there appears to be common agreement on general natural resource values, significant differences in preferences for management remain

We were struck by how much the population agrees with the importance of the natural environment and the factors that influence their expectations for quality of life. This agreement is the foundation for resolution of conflict. At the same time, we see quite a bit of disagreement on the specific actions suggested to manage the BNF. While this disagreement may not be a majority (in a quantitative sense) it is a significant minority.

Will this minority increase in size as more newcomers move to the valley? Will it decrease? Will the basis for agreement or disagreement change? How is it that so many people can agree about the basic qualities of the Valley and the mountains that surround it but disagree on specific management? These are questions we find troublesome, but to which we have no specific response.

Potential Research Themes

We've noted the paucity of research in several places above. Below, we identify and discuss several possible areas of research that would enhance understanding of the context within which the BNF operates and provide greater levels of knowledge about linkages between ecological and social systems. We propose these research themes as a way of communicating with not only managers but scientists as well. Examples of specific research questions and propositions at different scales of interest are shown in Table 2.

Managing in a transboundary context will require development of new processes and evaluation techniques

Human dimensions research in the BEMRP project has demonstrated that people embrace some important common values about the Bitterroot Valley, and yet there is disagreement on how the Bitterroot National Forest should be managed. One of the most significant advances for the Forest would be to understand means by which it could operate in a diverse and sometimes contradictory institutional and policy setting. Common values could become more explicit, and operations could make sufficient progress to rebuild trust between the public and the Forest Service. For example, greater public involvement earlier in planning processes followed by "follow-through" could help address trust issues.

Prior research infers that there are four major elements in the development of a transboundary strategy: (1) Identifying and communicating the elements of a decision process; (2) Recognizing and making explicit the legal and institutional constraints on the land and their implications for management; (3) The explication of psychological meanings attached to specific places in the valley; and (4) Evaluation of the efficiency and effectiveness of experiments in coordinated management actions. The first item relating to decision processes is tightly bound to another major cross-cutting conclusion of this research, the need to develop mechanisms to deal with contentious issues, and will be described in the next section of this report. The other three elements are addressed below.

- Recognizing legal and institutional constraints means providing for fuller understanding of private landowners' interests and the existing legal and administrative relationships on land and water resources in the valley

The protection of decision making authority of owners of private property is an important value among residents of the Bitterroot Valley (Schweke personal communication). For many landowners, the sale or subdivision of their agricultural land offers the greatest opportunity for financial gain, yet it also threatens those very values of open space and low congestion that residents appreciate and value. People within the Bitterroot Valley feel strongly about regulation of their land holdings. Efforts at revising the 1981 Ravalli County Comprehensive Plan have been met with fierce opposition, although the last two years have seen a reemergence of energy toward land use planning with a "Vision 2020" process.

Currently, legal and institutional constraints on the land are not widely known. Although important research has been conducted in the Bitterroot Valley on biophysical land classifications, relatively little effort has been expended on an administrative map of the valley. Significant property relationships, such as easements, water rights, and regulatory overlays are not apparent to participants in planning processes. Applying management direction to any given area requires clear information about the social and legal implications of changing resource conditions.

- Research on place attachment will offer better understanding on the location and extent of potential management actions

People express strong attachments to specific places and are concerned when changes in management direction affect their potential to sustain prior behaviors. BEMRP research has illuminated the close attachment

people feel for the land and its characteristics, but the strength of relationships between specific locations and their meanings to people is not clear. Additional research could focus on individual expectations and how meanings may change as well as issues relating to groups and organizations.

- Sustaining common values will require experiments in jurisdictional coordination

Multiple land owners and the institutional division of responsibilities makes it difficult to address problems relating to transboundary issues such as water, wide ranging wildlife, or access. One of the best ways to learn about the potential for cross-jurisdictional management is to attempt experiments with multiple parties and clearly communicate the costs and benefits of these efforts (Smith and others 1995). There is no shortage of issues on which experiments may be conducted, and a few examples may be helpful:

> The ownership of water rights by long term residents pushes for the maintenance of both private and public dams in the Bitterroot Mountains, but later subsequent designations of wilderness areas constrain operational capabilities. The types of actions that are acceptable to people in both wilderness and non-wilderness areas would greatly assist managers in forecasting dam maintenance budgets and operational details.
>
> State agencies manage wildlife populations, but the responsibility for habitat maintenance falls to federal and private landowners. Requirements of many wildlife species require the use of multiple types. For example, elk and deer roam freely across property boundaries, yet in certain periods of the year possess strict requirements for forage and cover. A description of attempts to coordinate habitat and population management could help other landowners grasp wildlife needs and stimulate individual action.
>
> Riparian habitat crosses boundaries as streams descend from the mountains. Coordinated efforts by agencies and local watershed groups could be attempted and evaluated to understand which dimensions of riparian habitat improvement are feasible.

For transboundary management experiments to become known and adopted on a larger scale, communication mechanisms among citizens and agencies will need additional development. The next section addresses these needs through recommendations for a new means for engaging multiple interest groups in program planning.

Mechanisms to deal with contentious issues need to be explored and assessed

BEMRP research has shown that people expect to participate in the decision-making process on the uses of the National Forest. And, the evidence that planning as modeling is insufficient to effectively address the diversity of values and demands placed on the Forest is plentiful. Yet the existing models of planning and public participation have fallen short of the hopes for a community/agency partnership, largely because of the mechanistic manner in which NEPA-based decision processes are interpreted and applied. People have emerged burned out or frustrated by current processes and have turned to other mechanisms, such as litigation or appeals, to demonstrate their concerns. The calcification of decision-making into formalized procedures with "bullet proof" NEPA documents is expensive, time consuming, largely unproductive, and a major barrier to learning. Since people do not agree on the means to attain commonly desired ends, BEMRP research argues for an more interactive, learning-based approach (Guthrie 1997). Venues for dialogue and deliberation, if not provided by the BNF, will eventually be demanded by citizens as they tire of a continual and bitter conflict over management of the landscape.

Exploring mechanisms to address contentious issues on the BNF will require new skills among both managers and scientists. The ability to function smoothly and confidently in group settings is a requirement of an interactive decision process, yet many individuals in the agency possess only modest training in group process, facilitation, and meeting management. In addition, an ability to communicate clearly, especially in written documentation, would bring a major improvement in public understanding of complex issues. Finally, the support of upper-level management for these types of "collaborative" processes has been recently articulated in the "collaborative stewardship" findings that have the support of the Chief of the Forest Service (USDA 1998).

Often agency planners and managers speak to resolving conflict between local preferences and national needs and direction. These potential conflicts may be real, but we would contend that seeking mechanisms ought to begin with exploring commonalities in values, beliefs and preferences. Dealing with national and local preferences may require more in the way of integration than balance.

Migration and rapid social change raise fundamental questions about human-nature relationships in a community undergoing transition

Growth of the human population in the Bitterroot Valley will continue into the next decade and will place additional pressures on natural

resources. The source of migrants, while estimated from secondary data (such as Internal Revenue Service county migration files) could be better identified to determine the relative strength of push and pull factors in migration decisions, more completely understand basic motives for migration, identify expectations for lifestyle, and measure preferences for the delivery of government services. Research elsewhere strongly suggests that new migrants will bring with them a set of expectations, values and skills different from long term residents. The types of recreational experiences desired by new residents and their expectations for BNF management will affect content of discussions in an open and deliberative decision process. Understanding preferences will help BNF officials more completely identify the source of conflict and develop planning strategies to deal with it.

New residents may bring with them experience and skills in political activism, exacerbating conflict with oldtimers and potentially leading to a new political environment in the valley. The new politics of the valley may or may not be conducive to deliberation and collaboration, but we would expect it to be so because retirees moving here will have a broad range of skills. The growth in the human population will also make the transboundary issues more complex, especially if additional fragmentation of private lands occurs. Assuming the population grows about 10000 people during the life of the new forest plan for the BNF, places will have to be found for approximately 3000 households, many of which will develop in ranchette form. These new residents will bring additional demands on the Forest for recreation, will desire water for irrigation, and further accelerate commercial development in the valley.

Managing the urban-wildland interface rises in significance as a researchable problem

The urban wildland interface represents a special and growing problem facing the Bitterroot Valley, and interacts strongly with the issues of rapid growth and the management across jurisdictional boundaries. As people move into areas on the perimeter of forest environments, several management considerations take on heightened priority. These include the risk of both wildfire and prescribed fire to the safety and health of the human population; the provision of services to a far-flung and unorganized population, the fragmentation of wildlife habitat by suburban land use patterns, and the availability of access to given locations.

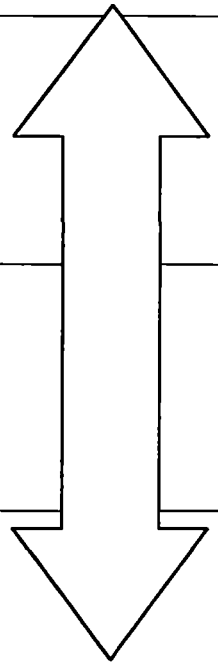
The risk of wildfire has already been recognized by residents as a key concern for their long-term habitation of the urban wildland interface. With assistance from groups like the Forest Service and the Bitterroot

RC&D, a small group of local citizens has formed a volunteer organization, "The Bitterroot Fire Interface Group" to inform land owners on means to protect their homes and families. Perceptions of fire risk, also relevant to the other research themes identified here, would help managers more directly develop educational programs directed toward creating more realistic expectations, suggest methods of communicating risk reduction methods around homes, and help develop dialog around the use of fire as a management tool.

Suburban development at the interface carries other important consequences, such as habitat fragmentation and constraints on access. Both are difficult problems and both carry a number of secondary impacts. For example, loss of habitat puts more pressure on the Forest Service to mitigate these losses on the lands it administers, thus furthering constraints on other land uses.

Table 2. Questions and propositions about major potential research themes as they vary by scale of interest. Not all cells are completed.

Scale	Migration and rapid social change	Trans-boundary relationships	Urban-wildland interface	Mechanisms to deal with contentious issues
Individual	Desired quality of life may differ among the newcomers and oldtimers?	People may be unaware of the issues associated with living next to the National Forest?	How do residents (new and old) perceive the role of fire (prescribed or wild) relative to their home? (Awareness of fire as a part of the ecosystem and perceptions of fire risk.)	How are people coping with change in forest policy? New neighbors? More tourists? Do they feel herd in the decision making process?
	What is the role and meaning of wilderness in the lives of valley residents?	Designated land uses may be perceived to threaten one another.	What are the implications of the reintroduction of the notion of wildness (griz) into an increasingly manicured and developed area?	To what extent do people perceive a consensus in decision making
	How is a quality "environment" defined by old timers and new comers? Are the common definitions at risk from increased development and population?	Are some people at odds with the idea of collaboration? To whom is it positive and why?		
	Resident and manager attitudes about change may differ.	As population grows, what type of institutional arrangements are needed to deal with impacts?		
	The relationship between amenity resource values and migration are undefined.			
Groups	How will resources and power be allocated among the populous of the bitterroot valley?	What is the potential for the development of collaborative arrangements in the management of the land use in Ravalli County?	What will emerge as the organizational structure of the migrants? How will that structure affect issues such as county planning, forest planning, etc.?	How can a county in economic transition, come to terms with an expansion of values?

Scale	Migration and rapid social change	Trans-boundary relationships	Urban-wildland interface	Mechanisms to deal with contentious issues
Communities		Organizations will need people with a variety of communication and analytical skills and an open mind		How will fire, water, wildlife, etc. be managed across jurisdictions?
	Increased population degrades and fragments the non-human setting in an exponential way due to synergistic and indirect impacts associated with development and land use change	What is the importance of having a large designated wilderness within the region?		
		What is the nature of the relationship between national and local policy? How much does the Bitterroot affect national policy and how much does the Bitterroot have to bear the will and cost of a national interest?		
Institutions	To what extent is there confusion over policy because of changing policies and people?	What is the role of the national forest in offering leadership within trans-boundary issues?	How is fire protection delivered to residents at the interface? What are the consequences to the organization (infrastructure, education, funding)?	

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